US Army Corps of Engineers®
Engineer Research and Development Center

GEOTRANS

Description and Background

The National Geospatial-Intelligence Agency (NGA) and TEC developed several reusable datum transformation and coordinate conversion software modules. These platform-independent modules each independently perform one specific type of conversion. This modularity promotes and eases integration into existing applications. These reusable modules, while appropriate for integration into other applications, are not appropriate for the novice user comfortable with a Graphical User Interface (GUI)-based application. GEOTRANS was developed to incorporate all these datum transformation and coordinate conversion modules into a GUI-based application, which is able to perform multiple conversions. GEOTRANS has been incorporated into JMTK, and replaces both MADTRAN and DTCC. GEOTRANS has also been incorporated into many COTS software packages also.

Key Capabilities

The underlying mathematical functions, which perform the calculations, are highly reusable software modules. Coding and documentation conforms to reuse guidelines developed by the Army Reuse Center. Users either type input coordinates into the GEOTRANS GUI or process coordinates in an ASCII file. GEOTRANS does one-step conversions to and from any NGA supported datum and coordinate systems some of which are list below.

Geocentric Coordinates
Local Cartesian Coordinates
Geodetic Coordinates
GEOREF Coordinates
MGRS Coordinates
Universal Transverse Mercator (UTM) Coordinates
Universal Polar Stereographic (UPS) Coordinates
Albers Equal Area
Conic Projection
Azimuthal Equidistant Projection
Bonne Projection
British National Grid Coordinates
Cassini Projection
Cylindrical Equal Area Projection
Eckert IV Projection
Eckert VI Projection
Equidistant Cylindrical Projection (Oblique)
Gnomonic Projection
Lambert Conformal Conic Projection
Mercator Projection
Miller Cylindrical Projection
Mollweide Projection
New Zealand Map Grid Projection
Ney's (Modified Lambert Conformal Conic) Projection Oblique
Mercator Projection Orthographic Projection
Polar Stereographic Projection
Polyconic Projection
Sinusoidal Projection
Stereographic Projection
Transverse Cylindrical Equal Area Projection
Transverse Mercator Projection
Van der Grinten Projection.

GEOTRANS performs datum transformations primarily using the Molodensky method and NGA datum shift parameters (ftp://ftp.nga.mil/pub/gig/tr8350.2/wgs84fin.pdf). Near the poles GEOTRANS uses the full three parameter transformation. In addition GEOTRANS supports the 7 parameter method between WGS 84 and either European 1950 (EUR-M) or Great Britain 1936 (OGB-M). It uses a special algorithm to convert between WGS 72 and WGS 84 and transforms between ellipsoid height and elevation using the EGM96 model.

Current Status

Currently the National Geospatial-Intelligence Agency (NGA) continues to update GEOTRANS is now available to U.S. citizens at no cost. GEOTRANS is non-proprietary and free of copyright restrictions.

To download GEOTRANS see: http://earth-info.nga.mil/GandG/geotrans/index.html

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